PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PCT04-027	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. **PCT/KR2004/001243**	International filing date *(day/month/year)* **25 MAY 2004 (25.05.2004)**	Priority date *(day/month/year)* 31 MARCH 2004 (31.03.2004)

International Patent Classification (IPC) or national classification and IPC

C07C 68/02(2006.01)i

Applicant

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1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demamd	Date of completion of this report
31 OCTOBER 2005 (31.10.2005)	20 JULY 2006 (20.07.2006)
Name and mailing address of the IPEA/KR Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer HONG, SUNG RAN Telephone No. 82-42-481-8146

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/KR2004/001243

Box No. I Basis of the report

1. With regard to the **language,** this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this reort as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:
pages 1-8 as originally filed/furnished
pages* 9 received by this Authority on 27/01/2006
pages* _____ received by this Authority on _____

☒ the claims:
pages _____ as originally filed/furnished
pages* _____ as amended (together with any statment) under Article 19
pages* 10 - 12 received by this Authority on 27/01/2006
pages* _____ received by this Authority on _____

☐ the drawings:
pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ the sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☒ the claims, Nos. 4
☐ the drawings, sheets _____
☐ the sequence listing *(specify)* : _____
☐ any table(s) related to sequence listing *(specify)* : _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to sequence listing *(specify)* : _____

** If item 4 applies, some or all of those sheets may be marked "superseded"*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/KR2004/001243

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1 - 5	YES
	Claims	None	NO
Inventive step (IS)	Claims	1 - 5	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1 - 5	YES
	Claims	None	NO

2. Citations and explanations (Rule 70.7)

This examination report is done based on the amended description and claims dated on January 27th, 2006 under Article 34.

1. Reference is made to the following document:

D1: US 5705091 (The Clorox Company) 6 January 1998 cited in the application

2. Novelty and Inventive Step of Claim 1

The subject matter of claim 1 relates to a method for preparing an ester bleach activator compound[Chemical Formula 1] comprising: (A) preparing a fatty acid monoester[Chemical Formula 2]; (B) making a chloroformate [Chemical Formula 3]; and (C) reacting the chloroformate with hydroxybenzene, its derivatives, or its salts in water.

D1 is considered to represent the most relevant state of the art. It discloses the ester bleach activator of the present invention and the preparing method thereof. According to the example 1(D1), sodium 4-(2-octanoyloxy ethoxy carbonyloxy) benzenesulfonate is prepared by the following steps: (AA) preparing 2-hydroxyethyl octanoate; (BB) making chloroformate by reacting the 2-hydroxyethyl octanoate with phosgene in the presence of pyridine which is an organic base; and (C) reacting the chloroformate with anhydrous sodium 4-hydroxybenzenesulfonate.

(Continued on Supplemental Box.)

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box V.

Compared with D1, the subject matter of claim 1 is directed to substitution of water for pyridine as a solvent in step(C). It cannot be considered obvious to a person skilled in the art to use water as a solvent in step (C). In addition, the effect thereof is remarkable compared with that of D1. Thus claim 1 of the present invention cannot be easily invented by a person skilled in the art.

Therefore, novelty and inventive step of the subject matter of claim 1 can be acknowledged under PCT Article 33(2) and 33(3).

3. Novelty and Inventive Step of Claims 2-5

Claims 2-5, which are dependent on claim 1, specify the fatty acid monoester of the step (A); the reaction temperature of the step (B); and the content of the water and the reaction temperature and the reaction time of the step (C). Therefore, claims 2-5 meet the requirements of PCT Article 33(2) and 33(3) with respect to novelty and inventive step.

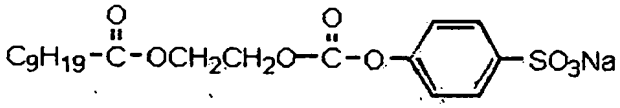
4. Industrial Applicability

It is an objective of the present claims 1-5 to provide a method for preparing an ester bleach activator compound. There is no reason for negating the industrial applicability of this invention. Consequently, claims 1-5 appear to meet the requirements of PCT Article 33(4).

(C) Preparing decanoyloxyethoxycarbonyloxybenzenesulfonate

10.55g NaOH and 61.24g 4-hydroxybenzenesulfonic acid sodium salt dihydrate are well dissolved at 0 to 30°C in 120ml of water. Then, 73.45g of the compound (2-chlorocarbonyl oxyethyl decanoate) is added thereto, and then stirred for 2 hours at 60°C. Subsequently, it is cooled to room temperature and then filtered to remove solvent and salt, and then dried to obtain 109.43g of white solid products having the structure of the following Chemical Formula 7.

Chemical Formula 7



As shown in the above embodiment, the method of the present invention using water as solvent in the final step is simple and economical, and shows high yield compared to the prior art described in the above background art.

INDUSTRIAL APPLICABILITY

As described above, the method of the present invention is simple and economical, so it may be usefully applied to make the ester bleach activator compound expressed by the Chemical Formula 1, which has many advantages.

WHAT IS CLAIMED:

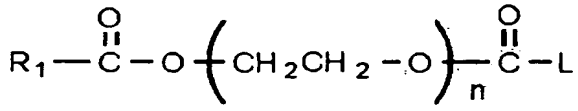
1. A method for preparing an ester bleach activator compound expressed by the following Chemical Formula 1, the method comprising:

(A) preparing a fatty acid monoester having the structure of the following Chemical Formula 2;

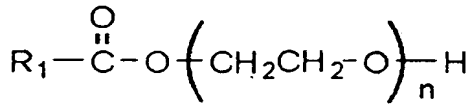
(B) making a chloroformate having the structure of the following Chemical Formula 3 by reacting the fatty acid monoester with at least one selected from the group consisting of phosgene, diphosgene and triphosgene in the presence of base; and

(C) reacting the chloroformate with hydroxybenzene, its derivatives, or its salts in water,

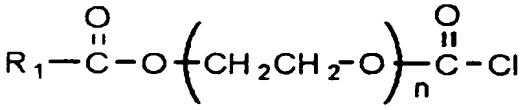
Chemical Formula 1



Chemical Formula 2



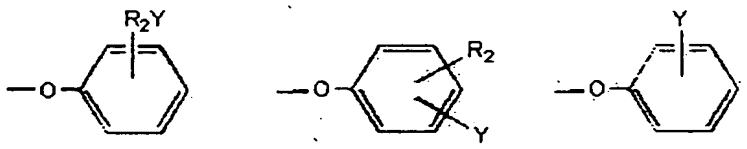
Chemical Formula 3



where, in the Chemical Formulas 1, 2 and 3, R_1 is a linear or branched alkyl of 1 to 19 carbon atoms, a linear or branched alkenyl of 1 to 19 carbon atoms, or a mixture of

at least two selected from them , n is an integer from 1 to 10, and L is one selected from the group having the structure of the following Chemical Formula 4,

Chemical Formula 4



where, in the Chemical Formula 4, R_2 is alkyl of 1 to 20 carbon atoms or alkenyl of 1 to 20 carbon atoms, Y is one selected from the group consisting of hydrogen, chlorine, bromine, SO_3M, CO_2M and OSO_2M, and M is one selected from the group consisting of hydrogen, alkaline metal ions, ammonium ion and equivalent alkali earth metal ions.

2. The method for preparing an ester bleach activator compound according to claim 1,

wherein the fatty acid monoester of the step (A) is prepared by reacting fatty acid with ethylene glycol or ethylene oxide.

3. The method for preparing an ester bleach activator compound according to claim 1, wherein a reaction temperature of the step (B) is kept in the range of 10 to 40°C.

4. The method for preparing an ester bleach activator compound according to claim 1,

wherein the content of the water is 10 to 60 wt% on the basis of the total weight

of the water, an chloroformate and hydroxybenzene, its derivatives or its salts.

5. The method for preparing an ester bleach activator compound according to claim 1, wherein a reaction temperature and a reaction time of the step (C) are respectively in the ranges of 20 to 100°C and 0.1 to 5 hours.